Speech recognition advances ATC simulation training

By Gary Pearson, Director of Products, Adacel

2003 was a milestone year for ATC simulation. The US Air Force’s decision to begin installation of tower simulation systems at over 90 airfields was both visionary and bold. Already with installation complete at 40 sites, the benefits to the units are tangible, and evidence that the decision to proceed with this programme was correct. Training times for new controllers have been dramatically reduced – by more than 30% in some cases – and in a time of increased operational deployment of unit aircraft, the advanced capabilities of the system allow all air traffic controllers to remain current even in situations of reduced operational traffic.

The size of this programme, the largest of its kind by far, although notable in itself, is not the only significance to the ATC simulation industry and ATC simulation user. The USAF decided from the outset that its simulation systems would not include pseudo-pilot capabilities but would be driven by speech recognition. A speech recognition capability has been a requirement of many simulation programmes in the past, but this is arguably the first programme in which speech recognition was the single method for interaction with the simulated aircraft and vehicles. Most, if not all, of the previously supplied speech recognition systems have been supplementary to the traditional pseudo-pilot.

Return on investment in one year

Speech recognition is significant to all simulation users, even for those facilities that are not yet ready to adopt speech recognition into their simulation environment. It dramatically and positively affects a sometimes overlooked factor in the adoption of simulation for training of air traffic controllers – cost of ownership. Much of the focus of an organisation is on the initial cost of acquisition of a simulator, but equally important is how much it will cost to operate. In the age of COTS hardware and the lowering cost of technology and technology replacement, the primary financial driver in operating a simulator is staff. Speech recognition is a one-off purchase, whereas pseudo-pilots are an annual recurring cost. Typically, a speech recognition solution will produce a return on investment in one year. This only stands true if the adopted speech recognition system is capable of replacing the pseudo-pilot and not for those speech recognition systems that are only capable of being used to supplement them. In traditional systems, many staff can be required to operate a training scenario – pseudo-pilots simulation supervisors, system operators and instructors. Speech recognition systems, such as those delivered to the USAF and 19 additional installations,
can be operated by the student alone, allowing more effective use of a valuable capital resource.

**Increased situational awareness**

Adacel’s speech recognition technology provides a number of features that reduce the cost of ownership even if pseudo-pilots are to be retained. It has built a simulation core that intelligently processes commands passed by the speech recognition engine. In a traditional simulator, a competent pseudo-pilot is not only capable of spotting and responding accordingly to a trainee controller who makes mistakes, the pilot is able to manipulate an aircraft using a series of basic simulation commands to execute what may be a complicated manoeuvre. With speech recognition, the simulator itself requires a greatly increased level of situational awareness and simulated pilot intelligence. The system must know when a command that has been issued is inappropriate and produce an intelligible response. For example, the simulated pilot when issued a ‘Cleared to Land’ from the controller may well respond with a ‘Request Low Approach’ if that was the instructor’s intent in creating the training scenario.

Speech recognition is by no means the only method of reducing cost of ownership and Adacel constantly strives to find additional acquisition and cost-saving measures. However, the unprecedented size of the USAF program has allowed Adacel to finally develop a technology that has proven what the simulation user has known all along – speech recognition, when done correctly, provides immediate training and financial benefits to the owner and operator of ATC simulation systems.